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| APPLICATION NO.                      | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--------------------------------------|-------------|----------------------|---------------------|------------------|
| 10/647,813                           | 08/25/2003  | Paul Albert Kohl     | PRMSP0285USSB       | 2354             |
| 7590                                 | 07/06/2004  |                      | EXAMINER            |                  |
| RENNER, OTTO, BOISSELLE & SKLAR, LLP |             |                      | NGUYEN, TUAN H      |                  |
| Nineteenth Floor                     |             |                      | ART UNIT            | PAPER NUMBER     |
| 1621 Euclid Avenue                   |             |                      |                     | 2813             |
| Cleveland, OH 44115-2191             |             |                      |                     |                  |

DATE MAILED: 07/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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|                              |                 |              |
|------------------------------|-----------------|--------------|
| <b>Office Action Summary</b> | Application No. | Applicant(s) |
|                              | 10/647,813      | KOHL ET AL.  |
|                              | Examiner        | Art Unit     |
|                              | Tuan H. Nguyen  | 2813         |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM  
 THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 25 August 2003.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 28-30,39,52 and 71-80 is/are pending in the application.
  - 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) 72-80 is/are allowed.
- 6) Claim(s) 28-30,39,52 and 71 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 25 August 2003 is/are: a) accepted or b) objected to by the Examiner.
 

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date 8/25/03.
- 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 29 is confusing and indefinite since it is unclear as to what happens to the second material used in the process step (II) but not included in the final product as recited in the first 6 lines; in the process step (V), how could the gas passes through the overcoat layer without passing through the underlying second material?

Claim 30 is confusing and indefinite, since it is unclear as to what would support the overcoat layer when the air gap has a height that exceeds the height of an adjacent conductive line?

Claim 39 recites the limitation "the norbornene polymer" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 71 recites the limitation "the first overcoat layer" in the last paragraph, line 2. There is insufficient antecedent basis for this limitation in the claim; last two lines, it is unclear as to how could an "overcoat layer of material" recited in the previous step "yielding overcoated conductive structures"? how could "material" become "conductive"?

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 28, 29, 52, 39 are rejected under 35 U.S.C. 102(b) as being anticipated by Kaanta et al. (cited by applicant).

Kaanta et al., figs. 1a-1h discloses the claimed semiconductor device having one or more air gaps 25 comprising a substrate 10, at least one conductive line 12, at least one air gap 25 and an overcoat layer 16 (see the final product in fig. 1h and related text on col. 2-3).

With respect to claim 52, Kaanta et al., figs. 1a-1h shows embodiment using air gap between lines on the same level (intralayer), but on col. 1, lines 5-10, lines 28-31, lines 45-51 disclose the air gap formed between lines on superposed layer (interlayer) in VLSI or ULSI circuits.

The claimed process steps have not given any patentable weight since a "product-by-process" claim is directed to a product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Marosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product-by-process" claim, and not the patentability of the process, and that old or obvious product produced by a new method is not patentable as a product, whether claimed in "product-by-process" claim or not. Note that applicant has the burden of proof in such cases, as the above caselaw makes clear.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Babich et al. discloses multiplayer interconnect structure containing air gaps.

***Allowable Subject Matter***

Claim 71 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

Claims 72-80 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: None of the references of record teaches or suggests the claimed semiconductor structure including the overcoat layer material extending into one or more spaces between the sacrificial material and the conductive material.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan H. Nguyen whose telephone number is 571-272-1694. The examiner can normally be reached on 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2813

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Tuan H. Nguyen  
Primary Examiner  
Art Unit 2813